UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION

A.O.A., *et al*.,	)	
	)	Case No. 4:11-cv-00044-CDP
Plaintiffs,	)	(CONSOLIDATED)
	)	
vs.	)	
	)	
THE DOE RUN RESOURCES CORPORATION, *et al*.,	)	
	)	
	)	
Defendants.	)	

DEFENDANTS' MEMORANDUM OF LAW IN SUPPORT OF MOTION TO EXCLUDE THE TESTIMONY OF PLAINTIFFS' EXPERT WITNESS DR. HOWARD HU

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Defendants[1] file this Memorandum of Law in support of their motion to exclude the proffered opinion testimony of Plaintiffs' expert Howard Hu, M.D., M.P.H., Sc.D. pursuant to Federal Rule of Evidence 702 and the principles outlined in *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993) ("*Daubert*"), and its progeny, respectfully showing as follows:

I. INTRODUCTION

Although Plaintiffs have two other experts – Karen Hopkins, M.D. and Clemente Vega, Psy.D. – who examined the 16 Final Discovery Cohort Plaintiffs and intend to opine at trial that Plaintiffs' alleged lead exposure caused a variety of physical and cognitive injuries, Plaintiffs apparently intend to try to bolster those opinions at trial by way of a third causation expert, Dr. Hu. Specifically, Dr. Hu, a professional expert who spends 40% of his time in recent years on expert work (Ex. A, 5/16/2019 Deposition of Dr. Howard Hu ("5/16/2019 Hu Dep."), at 27:20-28:3), attempts to bolster impermissibly the opinions of Drs. Hopkins and Vega that lead exposure caused Plaintiffs' alleged cognitive injuries. He also opines that lead exposure caused hypertension in one Plaintiff (G.J.H.O) and balance problems in two Plaintiffs (M.X.O.R. and D.D.P.S.).

Dr. Hu, however, did very little work and analysis in reaching these medical-causation opinions. And he certainly did not undertake the type of thorough analysis that is necessary to substantiate a causation opinion under *Daubert*. For starters, Dr. Hu did not apply *any* methodology whatsoever in reaching his *general causation* opinions—i.e., that lead is capable of causing Plaintiffs' claimed injuries—much less a reliable one. While Dr. Hu agrees that the Bradford-Hill criteria are the "gold standard" for determining general causation in toxic-exposure

[1] The Renco Group, Inc. ("Renco"), The Doe Run Resources Corporation ("DRRC"), D.R. Acquisition Corp. ("DRAC"), Doe Run Cayman Holdings LLC ("DRCH"), Ira L. Rennert ("Rennert"), Theodore P. Fox III ("Fox"), Marvin K. Kaiser ("Kaiser"), Jeffery L. Zelms ("Zelms"), and Albert Bruce Neil ("Neil") (collectively "Defendants").

cases, he did not apply those criteria, or any criteria for that matter, in reaching his opinions. Instead, in assuming that lead can ***cause*** Plaintiffs' alleged injuries because lead is ***associated*** with specific health effects in some of the population-based epidemiological literature, Dr. Hu forsakes the well-accepted principle in both epidemiology and case law that epidemiology is the study of disease in populations and does not address the issue of *causation*.

Dr. Hu's *specific causation* opinions—i.e., that lead in fact caused Plaintiffs' claimed injuries—fare no better. Dr. Hu failed almost entirely to account for potential alternative causes of Plaintiffs' claimed injuries, all of which are well established to occur in individuals exposed and not exposed to lead alike. Nor could Dr. Hu have conducted an analysis sufficient to survive *Daubert* as he never even reviewed the materials necessary to do so. In stark contrast with how he evaluates patients in his practice, Dr. Hu here did not perform detailed clinical examinations of Plaintiffs (indeed he did not even examine three of the Plaintiffs), review Plaintiffs' medical or education records, read the depositions of Plaintiffs or their caregivers, order any testing of Plaintiffs, speak with Plaintiffs teachers or treating physicians, or even review Defendants' experts' medical evaluations of Plaintiffs. In fact, in his 15-or-more-page report on each Plaintiff, Dr. Hu spends only two paragraphs summarizing his own cursory examinations of Plaintiffs (that is, for the 13 of 16 current Plaintiffs he actually examined). Instead, his reports consist primarily of restating the results of Dr. Hopkins' and Dr. Vega's examinations and vouching for their conclusions, without doing any independent work or analysis to verify their methodologies or results.

But Dr. Hu's opinions do not stop at medical causation. With respect to Plaintiffs' purported loss of intellectual ability, Dr. Hu goes one step further and offers a courtroom-derived, junk-science opinion that: (1) each Plaintiff's IQ score is 6.9 points lower than it would have been

had Plaintiffs not been exposed to lead; and (2) recognizing that Plaintiffs were exposed to many sources of lead other than from Doe Run Peru's ("DRP") operations of the Complex from October 1997 to June 2009, Dr. Hu takes the calculations of another of Plaintiffs' experts, Dr. David MacIntosh, concerning the annual percentage of community blood lead levels attributable to DRP's operations and assigns a specific percentage of the 6.9 IQ points (as well as the other neurodevelopmental deficits identified by only Dr. Vega) that Dr. Hu claims is attributable to emissions from DRP's operations. Dr. Hu's opinions that Plaintiffs lost a specific number of IQ points and that a percent of that loss is attributable to DRP's operations are convoluted, methodologically flawed, and if admitted, would be wildly prejudicial to Defendants when compared to their probative value. As Dr. Hu himself concedes, such analyses are ***not*** contained anywhere in the scientific and medical literature, have ***never*** been tested in any manner, and are not generally accepted in the scientific community. Indeed, Dr. Hu has never conducted such an analysis before doing so in this case and is not aware of anyone else ever conducting such an analysis. Further, like his specific causation opinions, this IQ-point-loss opinion is based on the application of observational, population-based studies to individuals in violation of well-accepted scientific principles. Finally, Dr. Hu stops short of articulating the relevance of his opinions because he disclaims any opinion that each Plaintiff's loss of some small number of IQ points attributable to DRP's lead emissions has any significance to a given Plaintiff's employment or educational future.

Dr. Hu's opinion that Plaintiffs are at an increased risk of hypertension in the future due to lead exposure is also unreliable and speculative. The Court should prevent Dr. Hu from offering any opinions on Plaintiffs' current medical condition or the cause of any current or future medical symptoms because his opinions are based on the same flawed and incomplete methodology Dr.

Hu relied on to arrive at his other causation opinions. Indeed, Dr. Hu has never reviewed any of Plaintiffs' medical records, much less their current records, and has not evaluated Plaintiffs, if at all, in four years. Dr. Hu has also done no work to attempt to quantify Plaintiffs' purported increased risk, which renders his opinions inadmissible.

Finally, the Court should preclude Dr. Hu from expressing any opinions about Plaintiffs' alleged exposure to arsenic or sulfur dioxide, including the risks presented by said exposure. At his deposition Dr. Hu testified that he was not prepared to offer such opinions.

For these reasons, and those set forth below, Dr. Hu's opinions are inadmissible under *Daubert* and the Federal Rules of Evidence, and the Court should exclude them as set forth herein.

II. LEGAL STANDARD

Under *Daubert* and Federal Rule of Evidence 702, a federal district court has a ***duty*** to act as a "gatekeeper," ensuring that only scientifically reliable and relevant expert evidence is presented to the jury. *Daubert*, 509 U.S. at 589. Rule 702 provides that "[a] witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if":

> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
> (b) the testimony is based on sufficient facts or data;
> (c) the testimony is the product of reliable principles and methods; and
> (d) the expert has reliably applied the principles and methods to the facts of the case.

"The screening requirement of Rule 702 has been boiled down to a three-part test." *Johnson v. Mead Johnson & Co., LLC*, 754 F.3d 557, 561 (8th Cir. 2014). "First, evidence based on scientific, technical, or other specialized knowledge must be ***useful*** to the finder of fact in deciding the ultimate issue of fact. This is the basic rule of relevancy. Second, the proposed witness must be ***qualified*** to assist the finder of fact. Third, the proposed evidence must be ***reliable***

or trustworthy in an evidentiary sense, so that, if the finder of fact accepts it as true, it provides the assistance the finder of fact requires." *Id.* at 561 (emphasis added). "The proponent of the expert testimony must prove its admissibility by a preponderance of the evidence." *Redd v. Depuy Orthopaedics*, 700 F. Appx. 551, 554 (8th Cir. 2017).

"To show that the expert testimony is relevant, the proponent must show that the reasoning or methodology in question is applied properly to the facts in issue." *Marmo v. Tyson Fresh Meats, Inc.*, 457 F.3d 748, 758 (8th Cir. 2006); *see also Daubert*, 509 U.S. at 591-92 ("Rule 702's 'helpfulness' standard requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility."); *Lauzon v. Senco Prods., Inc*., 270 F.3d 681, 687 (8th Cir. 2001) (court must consider "whether the proposed expert sufficiently connected the proposed testimony with the facts of the case"). To satisfy the reliability requirement, the party offering the expert testimony must show by a preponderance of the evidence both that the expert is qualified to render the opinion and that the methodology underlying his or her conclusions is scientifically valid. *Barrett v. Rhodia, Inc.*, 606 F.3d 975, 980 (8th Cir. 2010). "Failure to show the reliability of each step in an expert's methodology is fatal under *Daubert*." *In re Baycol Prod. Litig*., 532 F. Supp. 2d 1029, 1042 (D. Minn. 2007). Moreover, "[e]xpert testimony that is speculative is not competent proof and contributes nothing to a legally sufficient evidentiary basis." *J.B. Hunt Transp., Inc. v. GMC*, 243 F.3d 441, 444 (8th Cir. 2001).

In *Daubert*, "the Supreme Court set forth four factors to guide district courts in resolving admissibility questions: whether the expert's methodology has been tested, has been subjected to peer review, has a known or knowable error rate, and is generally accepted in the scientific community." *Kirk v. Schaeffler Grp. USA, Inc*., 887 F.3d 376, 391 (8th Cir. 2018); *see also Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 141 (1999) (expanding the holding of *Daubert* to testimony

based on "technical" and "other specialized" knowledge). "*Daubert*'s progeny provides additional factors such as: whether the expertise was developed for litigation or naturally flowed from the expert's research; whether the proposed expert ruled out other alternative explanations; and whether the proposed expert sufficiently connected the proposed testimony with the facts of the case." *Lauzon*, 270 F.3d at 687. In weighing these factors, the court properly exercises its gatekeeping function by "separat[ing] expert opinion evidence based on 'good grounds' from subjective speculation that masquerades as scientific knowledge." *Glastetter v. Novartis Pharm. Corp.*, 252 F.3d 986, 989 (8th Cir. 2001).

III. ARGUMENT

A. THE COURT SHOULD EXCLUDE DR. HU'S GENERAL CAUSATION OPINIONS BECAUSE HE DID NOT FOLLOW A RELIABLE METHODOLOGY IN REACHING HIS OPINIONS

To establish medical causation, Plaintiffs must first demonstrate ***general causation***, i.e., that lead is "capable of causing the type of harm from which the plaintiff suffers." *Junk v. Terminix Int'l Co.*, 628 F.3d 439, 450 (8th Cir. 2010) (describing general causation as a showing that the toxic substance at issue is capable of causing the type of harm from which the plaintiff suffers). A reliable methodology must support an expert opinion on general causation. Importantly, even ***"[a] supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are based upon some recognized scientific method."*** *Clark v. Takata Corp.*, 192 F.3d 750, 759 n.5 (7th Cir. 1999) (emphasis added); *see also Dodge v. Cotter Corp.*, 328 F.3d 1212, 1228 (10th Cir. 2003) ("[A] district judge asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist.").

Here, however, in arriving at his opinions that lead exposure is capable of causing (rather than being merely ***associated*** with) various health effects, specifically, reductions in intelligence,

neurobehavioral issues, hypertension, and balance problems, Dr. Hu did not undertake the rigorous type of analysis that *Daubert* and its progeny require. His report is devoid of any discussion of the available epidemiological and toxicological literature on the topic of lead's purported health effects, much less an analysis of such literature. And he failed to apply any criteria, including the well-established Bradford-Hill criteria, to arrive at his general causation opinion.

1. Dr. Hu Failed To Undertake A Rigorous Evaluation Of The Available Literature In Reaching His General Causation Opinions

Dr. Hu offers the opinion that ***any*** exposure to lead is associated with some adverse neurodevelopmental and physical effects. (Ex. A, 5/16/2019 Hu Dep., 24:7-12.) Dr. Hu, however, did not document in his Federal Rule of Civil Procedure 26 report *how* he arrived at that opinion, including what methodology he undertook, much less why it was a reliable one. Nor does his report reflect any evaluation of the large body of available scientific and medical literature on the topic of lead and its potential health effects. Indeed, his "analysis" on the topic of general causation is summarized in a ***single, four-sentence paragraph*** in his report, in which he refers to Plaintiffs' other expert David Bellinger's report and notes his agreement. (Composite Ex. B, 5/9/2019 Supplemental Expert Reports of Dr. Hu ("5/9/2019 Supp. Reports"), p. 11-12.) But an expert cannot merely adopt or repeat another expert's opinions without further analysis, and *Daubert* is not satisfied simply because another of Plaintiffs' experts said it. *See Metropolitan St. Louis Equal Housing Opportunity Council v. Gordon A. Gundaker Real Estate Co*., 130 F. Supp. 2d 1074, 1088 (E.D. Mo. 2001) (excluding expert testimony because the expert tried to rely on data sets collected by others without reviewing it to ensure accuracy); *see also In re Polypropylene Carpet Antitrust Litig.*, 93 F. Supp. 2d 1348, 1357 (N.D. Ga. 2000) ("An expert, however, may not simply repeat or adopt the findings of another expert without attempting to assess the validity of the opinions relied upon.").

In fact, regarding lead's alleged effect on intelligence – the health endpoint to which Dr. Hu pays the most attention – Dr. Hu's reports includes citation to only a couple studies – Lanphear, *et al.*, 2005 – which analyzes the relationship between low levels of lead exposure and IQ. (Ex. B, 5/9/2019 Supp. Reports, p. 14; Ex. A, 5/16/2019 Hu Dep., 196:10-17; *c.f.* Ex. C, 11/26/2019 Expert Report of Barbara Beck, Ph.D., DABT, ATS Fellow ("11/26/2019 Beck Report"), at pp. 10-20.) A general causation analysis, however, requires far more than citing to a single study. Rather, it requires "***examining the whole body of available studies*** to determine whether occasional findings are reliable, repeatable, and biologically plausible" and therefore, "[i]t is necessary to evaluate multiple studies, both positive and negative, consider the strengths and weaknesses of each; and weigh their points of agreement and contradiction to arrive at an overall scientific assessment of the evidence." (Ex. C, 11/26/2019 Beck Report, at p. 6.; *see also Cano v. Everest Minerals Corp.*, 362 F. Supp. 2d 814, 851 (W.D. Tex. 2005) ("This failure to consider both positive and negative associations in the literature is not reliable methodology...."); *In re Mirena IUS Levonorgestrel-Related Prod. Liab. Litig. (No. II)*, No. 19-2155, 2020 WL 7214264 (2d Cir. Dec. 8, 2020) ("In deciding whether a step in an expert's analysis is unreliable, the district court should undertake a *rigorous examination* of the facts on which the expert relies, the method by which the expert draws an opinion from those facts, and how the expert applies the facts and methods to the case at hand.") (emphasis original).

Likewise, in support of his opinion that lead exposure is associated with attention-related and other adverse behavioral outcomes and specific learning disorders, language disorders, and intellectual disability, Dr. Hu cites ***no studies*** whatsoever in support of his opinions. Instead, Dr. Hu's reports refer merely to the National Toxicology Program Monograph for exposures to low levels of lead ("NTP Monograph"). (Ex. B, 5/9/2019 Supp. Reports, p. 12.) The NTP Monograph

discusses the epidemiological literature and a reported ***association*** between low-level lead exposure and certain specific health effects, none of which Dr. Hu evaluates or discusses in his reports (other than Lanphear). (Ex. B, 5/9/2019 Supp. Reports, p. 12; Ex. A, 5/16/2019 Hu Dep., 24:7-12., 243:24-244:11.) The NTP Monograph does not reach "causal" determinations. (*See* NTP Monograh (2012), p. xviii ("*In children,* there is *sufficient* evidence that blood Pb levels <5 µg/dL are ***associated*** with increased diagnosis of attention-related behavioral problems . . ."). Reliance on the NTP Monograph also conflates the issue of setting the permissible level of exposure to a substance for purposes of regulation and public health standards with ***causation*** in the context of an individual's personal injury claim. As several courts, including the Eighth Circuit, have held, it is important to distinguish government agency risk assessments for establishing public health guidelines from the requirements for an expert analysis of causation in a toxic tort case. *Glastetter*, 252 F.3d at 991 (determining that FDA's decision that Parlodel may cause strokes was unreliable proof of medical causation because FDA employs a reduced standard vis-à-vis tort liability for gauging causation); *C.W. v. Textron, Inc.*, No. 3:10 CV 87 PPS, 2014 WL 1047940, at *5 (N.D. Ind. Mar. 17, 2014) ("mere exposure to toxins in excess of regulatory levels is insufficient to establish causation . . . [because] regulatory agencies are charged with protecting public health and thus reasonably employ a lower threshold of proof in promulgating their regulations than is used in tort cases."), *aff'd sub nom. C.W. ex rel. Wood v. Textron, Inc.*, 807 F.3d 827 (7th Cir. 2015) (quotations and citations omitted). Namely, ***proof of risk and proof of causation entail different questions*** because risk assessment frequently calls for a cost-benefit analysis. "Obviously, in a toxic tort case the court must focus on assessing causation, not on a cost-benefit analysis . . ." *McClain v. Metabolife Int'l, Inc.*, 401 F.3d 1233, 1249 (11th Cir. 2005). As a result, "the procedures commonly used in 'risk assessment' for the purpose of

establishing public health guidelines that represent 'acceptable' exposure levels for large populations are often . . . of marginal relevance to estimating 'causation'. . . ." *Id.*

Setting aside whether citation to a single study and a framework like the NTP is sufficient to sustain a general causation opinion, neither support Dr. Hu's conclusion that lead causes specific learning disorders, language disorders, and intellectual disability that Dr. Vega diagnosed Plaintiffs with. To the contrary, the NTP Monograph itself states: "**No** clear and specific pattern of Pb-related decreases in specific cognitive abilities has been identified . . ." (2012, NTP Monograph on Health Effects of Low-Level Lead) (emphasis added).[2] Consequently, at a minimum, Dr. Hu's opinions that lead exposure ***causes*** specific learning disorders, language disorders, and intellectual disability is unsupported. And regardless, he has provided no analysis to arrive at that opinion. *See, e.g.*, *Mitchell v. Gencorp Inc*., 165 F.3d 778 (10th Cir. 1999) (affirming exclusion of expert causation testimony where experts cited authority that a toxin was connected to one form of leukemia, but not the form plaintiff suffered).

2. Dr. Hu Failed To Apply Generally Accepted Criteria In Opining That Lead Exposure *Causes*, Rather Than Is Merely *Associated* With, Plaintiffs' Claimed Injuries

In addition to failing to analyze the available literature, Dr. Hu's mere reliance on the *associations* between lead exposure and adverse health effects discussed in the NTP Monograph and Lanphear paper, without further analysis, is entirely insufficient to sustain a general causation opinion on any of the outcomes on which Dr. Hu offers opinions. It is well established that "*an association is not equivalent to causation.* An association identified in an epidemiologic study may or may not be causal." Reference Manual on Scientific Evidence, Third Ed. (2011), at p. 552-

[2] Plaintiffs' expert Dr. Bellinger has likewise found "relatively few significant associations between specific measures of neuropsychological functions" and lead exposure. (Ex. E, Stiles & Bellinger, 1993.)

553 (emphasis original). Therefore, after determining that an ***association*** exists, an expert must apply a scientifically valid methodology for identifying a ***causal*** relationship. *Id.* at p. 598 ("Once this process is completed, researchers consider how guidelines for inferring causation from an association apply to the available evidence. We emphasize that these guidelines are employed only after a study finds an association to determine whether that association reflects a true causal relationship."); Restatement (Third) of Torts: Liability for Physical and Emotional Harm § 28 cmt. c (2010) ("[A]n evaluation of data and scientific evidence to determine whether an inference of causation is appropriate requires judgment and interpretation.").

The generally accepted methodology for evaluating whether an association is causal is application of the Bradford-Hill criteria.[3] *See* Reference Manual on Scientific Evidence, Third Ed. (2011), pp. 597-600; Ex. C, 11/26/2019 Beck Report, pp. 6-7; *see also Gannon v. United States*, 292 F. Appx. 170, 173 n. 1 (3d Cir. 2008) ("Bradford Hill criteria are broadly accepted criteria for evaluating causation"); *In re Avandia Mktg., Sales Practices and Prods. Liab. Litig.*, 2011 WL 13576, at *3 (E.D. Pa. Jan. 4, 2011) ("Bradford–Hill criteria are used to assess whether an

[3] The Bradford-Hill criteria are:

1. Strength of the Association: Is the magnitude of the association between the exposure and disease strong enough that it is not likely due to chance?
2. Consistency: Is the association consistently observed under different circumstances of exposure and in different study populations?
3. Specificity: Is the association specific to a certain disease?
4. Temporality: Does the exposure precede the disease and with sufficient time for the disease to manifest after the exposure?
5. Biological Gradient: Does the magnitude of the association increase with the magnitude of the exposure (i.e., is there a dose-response relationship)?
6. Plausibility: Is it biologically plausible that the suspected cause leads to the effect?
7. Coherence: Is the association consistent with what is known about the etiology of the disease?
8. Experiment: If preventative action is taken (i.e., the source of suspected exposure removed), is the frequency of effects altered?
9. Analogy: In the absence of data, are there similar chemicals and/or exposures that compare?

(Ex. C, 11/26/2019 Beck Report, pp. 6-7.)

established association between two variables actually reflects a causal relationship."). Indeed, ***Dr. Hu has even testified that the Bradford-Hill criteria are part of the "gold standard" process for determining causation.*** (*See* Ex. F, Declaration of Dr. Howard Hu, *Brown v. NL Industries, Inc*., No. 06-602096-CZ (Wayne Cty. Cir. Ct.), at ¶ 14**)**.

Yet, Dr. Hu did not apply those criteria—or any other criteria for that matter—in reaching his causation opinions here:

Q. Do you know what the Bradford Hill criteria are?

A. Yes.

Q. You didn't use them in this case, is that correct, use those criteria?

A. No. Bradford Hill criteria are really more in terms of general causation.

Q. Well, you have a general causation opinion, right?

A. Well, sure, but ***that's not necessary for lead and IQ***.

(Ex. A, 5/16/2019 Hu Dep., 24:7-12, 277:21-278:3 (emphasis added).) Rather, Dr. Hu contends that employing the Bradford-Hill criteria is "unnecessary" because epidemiological evidence exists for *certain* endpoints on which he is rendering general causation opinions. (*Id.*) But he has it backward. Epidemiology is only one component of assessing causation. As Dr. Hu has previously testified, the Bradford-Hill criteria, in turn, are the "generally-accepted set of guidelines for evaluating whether [those] ***epidemiological studies*** and other associate evidence establish causation." (*See* Ex. F, Declaration of Dr. Howard Hu, *Brown v. NL Industries, Inc*., No. 06-602096-CZ (Wayne Cty. Cir. Ct.), at ¶ 14 (emphasis added)); *see also* Reference Manual on Scientific Evidence, Third Ed. (2011), p. 598; *Soldo v. Sandoz Pharm. Corp.*, 244 F. Supp. 2d 434, 461 (W.D. Pa. 2003) ("However, application of the Bradford Hill criteria depends first upon an association by epidemiology between a disease and an exposure to an agent. The association must rule out chance."); *In re Avandia Mktg., Sales Practices and Prods. Liab. Litig*., 2011 WL 13576,

at *3 (E.D. Pa. Jan. 4, 2011) ("Bradford–Hill criteria are used to assess whether an established association between two variables actually reflects a causal relationship.").

Dr. Hu's failure to follow the methodology he considers the standard in his field renders his opinions unreliable. *See Rimbert v. Eli Lilly & Co.*, 2009 WL 2208570, at *14 (D.N.M. July 21, 2009) ("That Dr. Jackson chose not to apply the methodology that she personally considers to be the standard in her field to assess causation [Bradford Hill criteria] undermines the reliability of her testimony."); *Truck Ins. Exch. v. Magnetek, Inc.*, 360 F.3d 1206, 1213 (10th Cir. 2004) ("The district court noted that [the expert]'s opinion did not meet the standards of fire investigation [the expert] himself professed he adhered to."); *Magdaleno v. Burlington N. R.R. Co.*, 5 F. Supp. 2d 899, 905 (D. Colo. 1998) (excluding opinions based on inconsistency of expert's methodology with methodologies of "key authorities in his field."). As one court has said, "[a] professional who repudiates his own objective methodology in favor of a qualitative assessment will be hard pressed to show that his conclusions are the product of 'good science.'" *Buzzerd v. Flagship Carwash of Port St. Lucie*, 669 F. Supp. 2d 514, 527 (M.D. Pa. 2009).

Instead of reasoning from known facts, Dr. Hu reasoned from "an end result in order to hypothesize what needed to be known but what was not." *Sorensen By And Through Dunbar v. Shaklee Corp.*, 31 F.3d 638, 649 (8th Cir. 1994). Dr. Hu should not be permitted to testify simply that he knows it to be true that lead is associated with various adverse health effects. Even if he believes the connection is an obvious one (which it is not), he must undertake an actual scientific methodology and then, under Rule 26 and *Daubert*, show that work so Defendants and the Court can vet it for reliability. His general causation opinions, supported by his *ipse dixit* alone, are plainly inadmissible.

B. DR. HU'S SPECIFIC CAUSATION OPINIONS ARE INADMISSIBLE BECAUSE THEY TOO ARE NOT BASED ON A RELIABLE METHODOLOGY

Even if Dr. Hu's general causation opinions were the product of reliable principles and methods as required under *Daubert*—and they were not—he failed to apply those opinions reliably to the facts of these cases in opining that lead-exposure caused Plaintiffs' alleged neurodevelopment adverse effects, as diagnosed by Dr. Vega. The same is true for Dr. Hu's opinions that lead exposure caused two Plaintiffs (M.X.O.R. and D.D.P.S.) to have balance issues and one (G.J.H.O) to have hypertension.

Instead, Dr. Hu uses a nominal at best – and fundamentally flawed – analysis similar to that employed by Plaintiffs' other experts: (1) lead is associated in the population-based epidemiological literature with certain health effects; (2) Plaintiffs were exposed to lead (based on actual blood lead level ("BLL") data or Plaintiffs' expert Dr. David MacIntosh's estimates; and (3) therefore lead exposure caused Plaintiffs' claimed injuries. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 222:17-22.) Simply put, this type of conclusory, results-driven opinion testimony does not satisfy the requirements of *Daubert* because it fails to apply the same level of rigor Dr. Hu himself would apply in his practice and fails to take serious account of—if at all—other potential causes of Plaintiffs' claimed injuries.

1. Dr. Hu Lacks The Necessary Foundation To Offer His Specific Causation Opinions

When a patient is referred to Dr. Hu in his private practice for possible lead exposure, his evaluation includes obtaining a comprehensive occupational and environmental history, complete medical history, review of symptoms and systems, and medication history. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 56:7-21.) He also evaluates the patient's medical and exposure records, conducts a physical examination of the patient, and reviews laboratory tests before arriving at an initial

impression of the cause of the patient's symptoms. (*Id.*) After arriving at an initial impression, he may order further tests, request other records, and consult with specialists in other medical fields. (*Id.*) Dr. Hu, however, did none of that work here in reaching his opinions regarding Plaintiffs.

First, despite a clinical evaluation of the patient being a critical component of Dr. Hu's standard practice outside the courtroom, here, Dr. Hu ***did not even examine three of the 16 Final Discovery Cohort Plaintiffs*** (J.J.E.C., W.F.T.P., and E.E.P.S.) and has no plans to do so. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 61:4-16; 62:4-6, 62:12-15.)

Second, for those 13 Plaintiffs Dr. Hu did examine, his evaluations stand in stark contrast to those he performs in his practice. Dr. Hu did not take a full medical, occupational, or environmental history for any Plaintiff. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 63:12-20.) His physical examinations did not include assessments of Plaintiffs' neuropsychological status, even though that forms the core basis of his opinions in these cases. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 185:23-186:1.) Rather, Dr. Hu's examinations consisted of no more than: (1) administering a Romberg test to assess balance (even though such a test is not even intended to evaluate balance);[4] (2) testing Plaintiffs' blood pressure (which Dr. Hopkins did not do); and (3) examining Plaintiffs' skin. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 63:21-64:11.)

Third, while Dr. Hu testified that "of course" he would review the medical records for one of his patients (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 54:11-13), here he did not review ***any*** of Plaintiffs' medical or education records, nor any of the substantial amount of discovery available in these cases relevant to Plaintiffs' claims, including their Profile Forms, discovery responses, or Plaintiffs' and their mothers' depositions. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 41:23-42:7; 52:4-25; 63:12-20.) Dr. Hu has also never spoken with any of the Plaintiffs' healthcare providers,

[4] *See* Ex. G, 2/20/2020 Deposition of Defendants' Expert Dr. Elias Chalhub, 73:11-74:12 (noting the Romberg test Dr. Hu performed is not a balance test).

teachers, or tutors. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 51:21-52:3.) Dr. Hu also did not order any testing for Plaintiffs, including blood lead testing, nor did he review or order any radiology, scans, or nerve conduction tests. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 70:7-8; 71:9-11; 71:18-72:2.)[5]

Moreover, Dr. Hu did not even review the results of Defendants' experts' examinations of Plaintiffs and take their information and analyses into account. (Ex. I, 8/6/2020 Rebuttal Dep. of Howard Hu ("8/6/2020 Hu Dep."),17:14-20:10.) What is more, while Dr. Hu does not dispute that this information generally would be necessary for anyone to review before reaching a causation opinion, here Dr. Hu excuses his neglect by citing a lack of available time:

> Q. As a scholar, as a medical doctor, you don't think it's important to evaluate all the information available to you before rendering an opinion on a topic?
>
> * * *
>
> A. **There's obviously, for me at least, a time limitation on how much time I have to review everything.** For instance, I simply just didn't have the time to read every single one of Banner's reports, or Morote, or any of the other reports on each of the individual Plaintiffs.

(Ex. I, 8/6/2020 Hu Dep., 55:9-25 (emphasis added).)

In sum, Dr. Hu lacks the foundation necessary to reach reliable conclusions about Plaintiffs' health and the cause of their alleged conditions. *See Parmentier v. Novartis Pharms. Corp*., No. 1:12-CV-45 SNLJ, 2012 WL 2326047, at *5 (E.D. Mo. Jun. 19, 2012) (excluding expert's specific causation opinions as without "the reliable foundation required under Rule 702 and *Daubert*," by rendering opinion "despite not having reviewed all of Ms. Johnson's relevant

[5] *See* Ex. H, 11/26/2019 Report of Defendants' Expert Neurologist Dr. Elias Chalhub, p. 8 (Dr. Chalhub, an expert in neurology, an area on which Dr. Hu does not have expertise, has pointed out that no plaintiff has an EEG, nerve conduction velocities, EMG, MRI, MRI spectroscopy, or metabolic or genetic studies, testing necessary to reach conclusions regarding the neurological deficits Plaintiffs' experts, including Dr. Hu, purportedly assign to Plaintiffs).

medical and dental records."); *Pritchard v. Dow Agro Sciences*, 705 F. Supp. 2d 471 (W.D. Pa. 2010), *aff'd*, 430 Fed. Appx. 102 (3d Cir. 2011) (excluding expert's opinion under *Daubert* because his conclusions did not flow from the data because he relied on incomplete information (medical records, pesticide application records); "[t]he admission of Dr. Omalu's proffered testimony, which is based on a speculative set of facts and without a valid scientific connection, would not be helpful to the trier of fact."); *Claar v. Burlington N. R.R. Co.*, 29 F.3d 499, 502 n.3 (9th Cir. 1994) (affirming district court decision to exclude expert testimony because the expert never examined the plaintiff's medical records, and thus his testimony was "lacking a basis in fact"); *Ingram v. Solkatronic Chem., Inc.*, No. 04-CV-0287-CVE-PJC, 2005 WL 3544244, at *16 (N.D. Okla. Dec. 28, 2005) (excluding expert's causation testimony because he conducted differential diagnosis without the information necessary to exclude reliably alternative sources of plaintiffs' present illness); *Haller v. AstraZeneca Pharms. LP*, 598 F. Supp. 2d 1271, 1295-96 (M.D. Fla. 2009) (a differential diagnosis is unreliable under *Daubert* when an expert's "hurried, cursory, and incomplete" review of medical records resulted in significant errors); *Perkins v. Novartis*, Civ. A. No. 12-662, 2013 WL 2949045, at *3-4 (W.D. La. June 14, 2013) (precluding plaintiff's expert from testifying regarding specific causation despite his qualifications as an "eminent oral surgeon" because his "bare opinions" unsupported by plaintiff's medical records are "not sufficient to satisfy *Daubert*.").

2. Dr. Hu Cannot Fill-In The Gaps Of His Incomplete Analysis By Merely Reviewing The Reports Of Plaintiffs' Other Experts

Plaintiffs may contend that Dr. Hu need not review these important case materials because he had the Rule 26 reports of Plaintiffs' other causation experts, Dr. Vega and Dr. Hopkins. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 53:6-11; 266:9-12.) Not so.

For starters, as detailed in the concurrently filed motions to exclude Drs. Hopkins and Vega, their reports and evaluations are also fundamentally flawed and based on unreliable methodologies. Therefore, Dr. Hu's opinions, relying almost entirely on the accuracy of these other experts' reports, must also be excluded. (*See, e.g.*, Ex. I, 8/6/2020 Hu Dep., 48:7-12 (taking Dr. Vega's assessments "as the truth" and "not independently questioning them.").

Regardless, such unthinking reliance on only Plaintiffs' other experts' slanted analyses of the available materials – while also disregarding Defendants' experts' evaluations – cannot sustain Dr. Hu's opinions. An expert cannot simply adopt or repeat the findings of another expert without assessing the validity of those opinions. *DMS Imaging, Inc. v. Dwyer Instruments, Inc.*, No. 08-00360-CV-W-FJG, 2010 WL 11618964, at *3 (W.D. Mo. Jul. 12, 2010); *see also In re Polypropylene Carpet Antitrust Litig*., 93 F. Supp. 2d at 1357 ("An expert, however, may not simply repeat or adopt the findings of another expert without attempting to assess the validity of the opinions relied upon.").

For example, in *DMS Imaging*, the expert sought to rely on data and analysis provided to him by several engineers in rendering his opinions but did not independently verify or evaluate those opinions before rendering his opinions based on those findings. The court excluded the expert's testimony, holding the sponsoring party failed to "identify how [the expert] confirmed the accuracy of the [ ] engineers' opinions through application of his expertise knowledge in electrical engineering." *Id*. Similarly, in *Metropolitan St. Louis Equal Housing Opportunity Council v. Gordon A. Gundaker Real Estate Co.*, 130 F. Supp. 2d 1074, 1088 (E.D. Mo. 2001), the court considered a similar situation and excluded expert testimony because, as here, the expert tried to rely on data sets collected by others without reviewing it to ensure accuracy. *Id*. ("Given the importance of the accuracy of the underlying data, a fact he admitted, it would have been prudent

for him to examine the test report forms and the debriefing forms to assure himself of the accuracy of the underlying data.").

Here, Dr. Hu purports to opine that Plaintiffs each experienced a reduction in intelligence and other neurological deficits as diagnosed by Dr. Vega. Dr. Hu, however, simply summarized Dr. Vega's and Dr. Hopkins' summaries of their opinions and evaluations for Plaintiffs and offered the opinion that lead is capable of causing the neurologic deficits purportedly identified. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 6-11.) He did not review any of the underlying data for Dr. Vega's neuropsychological tests or review the medical and education records and testimony of the Plaintiffs and their mothers. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 177:25-178:4, 186:2-5.) He also made no effort to verify the accuracy of Dr. Vega or Dr. Hopkins' assessments of each Plaintiff. (*Id*.) Indeed, Dr. Hu did not even have the materials necessary to undertake such an analysis. For example, Dr. Hu did not have the portion of Dr. Vega's report that describes the basis for Dr. Vega's neuropsychological battery. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 48:19-22.) Dr. Hu also did not review the depositions of Dr. Vega or Dr. Hopkins (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 13:16-20, 14:7-11) or the plaintiff-specific observations of Defendants' experts, Drs. Chalhub, Banner, and Morote, who each also separately interviewed and evaluated Plaintiffs. (Ex. I, 8/6/2020 Hu Dep., 18:6-22.) He thus does not know whether there is any information in Drs. Chalhub, Banner, or Morote's evaluations that could change his opinions.

Simply put, Dr. Hu did not have the materials necessary to assess the reliability of Dr. Vega and Dr. Hopkin's opinions whatsoever, had he even endeavored to do so. Instead, as Dr. Hu put it, he merely ***assumed*** their opinions were reliable given that Dr. Vega's and Dr. Hopkins *curriculum vitae* suggest they are "well credentialed and competent":

Q. How did you make that assessment not knowing what's in them?

A. Because I had the benefit of full histories taken by Dr. Hopkins and Dr. Vega who are clearly very well credentialed and competent physicians and a neuropsychologist.

* * *

Q. What's your basis for concluding that they are competent?

A. Looking at their curriculum vitae.

(Ex. A, 5/16/2019 Hu Dep., 53:6-25.)

The problem with Plaintiffs' strategy in having Dr. Hu rely entirely on Plaintiffs' other experts to do the work necessary to support his own opinions is two-fold. First, it assumes Dr. Vega and Dr. Hopkins' summaries of their evaluations are objective and complete, and, as described in the concurrently filed motions to exclude both, they are not. Second, it improperly prevents Defendants from exploring the basis of Dr. Hu's opinions.

Dr. Hu's opinions on J.R.E.L. demonstrate both issues. J.R.E.L. graduated secondary school and is performing well in college where he is studying industrial engineering. Critically, this fact is not mentioned ***anywhere*** in Dr. Vega's or Dr. Hopkins' Rule 26 reports. Because Dr. Hu has not evaluated the merits or reliability of Dr. Vega's analysis or any of the materials underlying those opinions, he reached his opinions not even knowing, much less considering, J.R.E.L.'s real-world performance beyond what Dr. Vega and Dr. Hopkins wrote in their reports. Dr. Hu thus has no reliable basis for assessing whether, for example, Dr. Vega's opinion that J.R.E.L. functions at the level of a nine-year-old is consistent with someone successfully studying industrial engineering in college or whether J.R.E.L.'s profile even matches that of someone with lead exposure-related adverse neurodevelopment.

When asked about this discrepancy between Dr. Vega's opinions and record evidence, Dr. Hu ***refused*** to answer the questions because he was not aware of this fact and knows nothing about the education system in Peru:

Q. Do you recall, Doctor, that [J.R.E.L.] also graduated from secondary school and is attending university full time studying industrial engineering?

A. I don't specifically recall and I don't have that record in front of me.

Q. Sure. Okay. Let me just ask you, then, at a general level. If somebody who's attending university and studying industrial engineering in Peru, based on your experience and expertise, Doctor, is that more consistent with somebody who has an IQ of 72 or somebody with an IQ of 100?

* * *

A. I don't have an opinion on that.

Q. You don't have any viewpoint on that based on your experience and expertise?

A. I would not. ***I decline to give an opinion on that.***

Q. Well, I appreciate that, Doctor, but I'm interested in your viewpoint on it.

A. Well, ***I'm declining***.

Q. I take it that by – you can -- you can let me know if I'm wrong about this, Doctor. I take it that you are of the view, and this is why you are declining, that somebody who graduates -- who attends university and is studying industrial engineer, that course of -- of schooling is more consistent with an IQ of 100 than an IQ of 72?

* * *

A. I mean, I -- ***I'm declining because I don't know anything about the educational system in Peru. I'm not expert enough to understand how IQs are calibrated in this situation so I just feel not able to render an opinion***.

(Ex. I, 8/6/2020 Hu Dep., 52:14-54:1 (emphasis added).)

In short, Dr. Hu's "blinders-on," results-driven approach, focusing only on the conclusions of Plaintiffs' other retained experts, without any independent evaluation of their methods, results, or conclusions, is not a valid methodology under *Daubert*. *See Lust v. Merrell Dow Pharm., Inc*., 89 F.3d 594, 596 (9th Cir. 1996) (affirming district court decision finding that expert's conclusion was unreliable as he had "pick[ed] and chos[en]" from the scientific landscape). The Court should preclude the jury from hearing it.

3. Dr. Hu Failed To Consider And Rule Out Potential Alternative Causes of Plaintiffs' Injuries

In a medical or neuropsychological context, the accepted methodology for rendering a specific causation opinion—that lead caused the harm alleged by each Plaintiff—is called a "differential diagnosis." Differential diagnosis (or differential etiology) is an analytical process whereby an expert "rules in" all possible causes of the particular disease or impairment and then "rules out" by process of scientific reasoning possible causes until the most likely cause is identified. *Glastetter*, 252 F.3d at 989; *see also Kudabeck v. The Kroger Co.*, 338 F.3d 856, 862 (8th Cir. 2003); *Scott v. Dyno*, 16-cv-1440, 2021 WL 1750238, at *3 (E.D. Mo. May 4, 2021) ("A differential diagnosis [is] a technique that identifies the cause of a medical condition by eliminating the likely causes until the most probable cause is isolated.") (internal quotations omitted). The Eighth Circuit has cautioned that the medical community and legal community have different understandings of what a proper "differential diagnosis" entails. *See Turner v. Iowa Fire Equip. Co*., 229 F.3d 1202, 1208 (8th Cir. 2000). While in medicine a "differential diagnosis" means "a systematic comparison of symptoms to determine which of two or more *conditions* is the one from which a patient is suffering," *id*. (citing Stedman's Medical Dictionary 474 (26th ed. 1995)) (emphasis in original), legally, it means "a technique to identify the *cause* of a medical condition by eliminating the likely causes until the most probable cause is isolated[.]" *Scott*, 2021 WL 1750238, at *7 (emphasis in original) (concluding expert's causation opinion was inadmissible based on "his failure to properly consider and rule out other possible causes of [Plaintiff's] injuries").

Only if this process is carried out in a scientifically rigorous manner can it sustain a specific causation opinion. *Turner*, 229 F.3d at 1208 (citing *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 262–63 (4th Cir. 1999). The failure to rigorously "rule in" or "rule out" possible causes,

however, is fatal to a specific causation opinion. *See, e.g.*, *Israel v. Spring Indus., Inc*., No. 98-CV 5106, 2006 WL 3196956 (E.D. N.Y. Nov. 3, 2006); *In re Breast Implant Litig*., 11 F. Supp. 2d 1217, 1229, 1238 (D. Col. 1998).

Dr. Hu did not conduct a reliable differential diagnosis with respect to Plaintiffs, and, therefore, his specific causation opinions should be excluded. In fact, Dr. Hu did not evaluate ***any*** potential alternative causes of the injuries for half of the 16 Plaintiffs. (*See* Ex. B, 5/9/2019 Supp. Reports for S.R.B.C., G.S.A.Y., J.R.E.L., J.J.E.C., E.E.P.S., J.R.R.B., W.F.T.P., and R.A.Y.A.). For the other half, Dr. Hu merely evaluated nutrition and anemia as potential alternative causes for Plaintiffs' neuropsychologic injuries and intelligence. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 260:13-24.)

This is problematic because Dr. Hu ***concedes*** that numerous other factors could impact one's intelligence and cause neurodevelopment issues, including a number of potential alternative causes that are far more likely to influence intelligence than lead exposure. For example, Dr. Hu acknowledges that a parent's IQ is more likely to impact a person's IQ than is lead exposure. (Ex. I, 8/6/2020 Hu Dep., 121:7-123:2.) Yet, Dr. Hu did not evaluate parental IQ for ***any*** of the Plaintiffs. (Ex. A, 5/16/2019 Hu Dep., 217:12-13.) Similarly, while home environment can impact a person's IQ, and is also far more influential than lead exposure (something Dr. Hu could not recall at his deposition) (Ex. C, 11/26/2019 Beck Report, pp. 14-15; Ex. A, 5/16/2019 Hu Dep., 24:7-12; Ex. I, 8/6/2020 Hu Dep., 123:13-124:3), Dr. Hu did not evaluate ***any*** Plaintiff's home environment. Indeed, while a differential etiology requires that an expert attempt to rule out alternative causes until the most likely cause is identified, Dr. Hu could not say whether lead exposure was more likely to be the cause of Plaintiffs' IQ than other factors like parental IQ, home environmental, socioeconomic status, and nutrition. (Ex. I, 8/6/2020 Hu Dep., 126:9-128:21.)

This failure to consider even the most obvious alternative causes is ***fatal*** to his specific causation opinions. *See Kirk*, 887 F.3d at 392 ("When an expert's differential analysis fails to rule in exposure to the alleged cause at issue (general causation) and fails to rule out other possible causes, the specific causation opinion is not sufficiently reliable and should be excluded."); *Clausen v. M/V New Carissa*, 339 F.3d 1049 (9th Cir. 2003) ("A district court is justified in excluding evidence if an expert 'utterly fails . . . to offer an explanation for why the proffered alternative cause' was ruled out.").

Dr. Hu likewise made no attempt whatsoever to consider, much less evaluate rigorously, the potential impact of the altitude at which Plaintiffs reside on their cognition. Dr. Hu was confronted with several studies at his deposition demonstrating that altitude can impact cognition (Ex. I, 8/6/2020 Hu Dep., 70:17-100:14), but could point to no study showing that altitude did *not* have an impact. (*Id.* at 100:15-101:22.) This failure to assess relevant literature and issues provides further basis to exclude Dr. Hu's specific causation opinions. *See In re Dicamba Herbicides Litig*., No. MDL 2820, 2019 WL 6340260, at *8 (E.D. Mo. Nov. 27, 2019) (excluding expert who attempted to extrapolate data without "investigat[ing] or account[ing] for differences in geography and growing conditions."); *Roberts v. Gen. Motors, LLC*, No. 4:13-CV-541 CAS, 2015 WL 6955362, at *10-16 (E.D. Mo. Nov. 10, 2015) (statistical analysis should be stricken if the data are not able to account for particular variables at play in the case at bar).

The same is true of Dr. Hu's opinions regarding lead exposure and other non-neurologic outcomes. For example, Dr. Hu diagnosed G.C.S. with hypertension and opines that his lead exposure caused this hypertension. Dr. Hu, however, acknowledged that G.C.S. is obese. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 246:4-247:7). Dr. Hu recognizes that obesity is a risk factor for hypertension (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 247:15-248) and agrees that each identified risk

factor for a health effect is not necessarily the cause of that health effect in a given person. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 248:16-19.) He further recognizes that there is no reliable way to determine whether in a given person, his/her exposure to lead, as opposed to weight, caused the hypertension. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 248:20-249:1.) Nonetheless, he undertook no effort to attempt to identify the cause of G.C.S.'s hypertension. Rather, simply because he believes lead exposure is a ***risk factor*** for hypertension, Dr. Hu assumes that lead "was a direct contributing factor towards" G.C.S.'s development of hypertension, perhaps even in combination with their weight. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 249:2-251:12.) Essentially, ***Dr. Hu conflates the concepts of risk factors, association, and general causation, with specific causation***. But simply because something is a risk factor for a disease does not mean it caused that disease in a particular individual. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 248:16-19.)

Furthermore, even for those conditions that Dr. Hu does claim to have evaluated, closer scrutiny reveals that Dr. Hu failed to take "serious account of other potential causes," if at all. *Cooper v. Smith & Nephew, Inc*., 259 F.3d 194, 202 (4th Cir. 2001). For example, Dr. Hu claims he evaluated malnutrition as a potential alternative cause for Plaintiffs D.D.P.S. and G.S.A.Y.'s purported adverse neurodevelopment. At his deposition, he claimed to have been able to rule nutrition out because he never saw confirmation in these Plaintiffs' medical records of "true stunting" reflective of malnutrition. (Ex. A, 5/16/2019 Hu Dep., 263:3-19, 265:12-25.) But, of course, ***he never reviewed the medical records for D.D.P.S. and G.S.A.Y.'s, or any Plaintiff.*** (*Id.*) Similarly, for M.X.O.R., Dr. Hu considered whether anemia caused by iron deficiency could have contributed to her claimed adverse neurodevelopment. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 275:8-25.) He, however, ruled it out merely because Dr. Hopkins and Dr. Vega documented no record evidence of anemia. (*Id.*) Dr. Hu did not read any of the Plaintiffs' or their mother's

depositions and thus did not consider that M.X.O.R.'s mother confirmed that M.X.O.R. was diagnosed with anemia. (Ex. J, Deposition of Carmen Rosa Rodrigo Bendezu, at 107:3-4.) Dr. Hu also did not review any of M.X.O.R.'s medical records. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 275:8-25.)

In the end, Dr. Hu has not even attempted to reach a valid conclusion on the most likely cause of the Plaintiffs' injuries. As Dr. Hu candidly puts it, he "did not rule anything out":

> Q. So what are the types of other potential alternative explanations for these folks' adverse neurodevelopment that you analyzed and ruled out?
>
> **A. I did not rule anything out.**

(Ex. A, 5/16/2019 Hu Dep., 24:7-12, 257:25 – 258:3) (emphasis added). Dr. Hu's failure even to attempt to evaluate the most likely cause of Plaintiffs' claimed injuries under the facts of each Plaintiff's individual histories and circumstances renders his specific causation opinions incomplete and invalid. *Turner*, 229 F.3d at 1208-09 (excluding expert causation because he "did not systematically rule out all other possible causes" of the plaintiff's injury and "admitted that he made no attempt to consider all the possible causes, or to exclude each potential cause until only one remained, or to consider which of two or more non-excludable causes was the most likely to have caused the condition."); *Cano*, 362 F. Supp. 2d at 840 ("Because Dr. Dollinger refuses to rule out or otherwise quantify his alleged risk factors for each Plaintiff's cancer, his specific causation opinions are neither reliable as a matter of medical science nor relevant as a matter of federal and Texas law.").

Finally, Dr. Hu cannot avoid engaging in a reliable differential analysis by reflexively labeling all potential risk factors for the Plaintiffs' alleged injuries as "substantial contributing causes," as he has sought to do here. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 222:17-22; Ex. I, 8/6/2020 Hu Dep., 45:7-12, 125:18-126:7.) Such logic simply does not work when other known

causes – some of which are far stronger risk factors for the condition in question – exist. Distinguishing sole causes from concurrent causes in that circumstance requires analysis, and there is no such analysis here. *See Turner*, 229 F.3d at 1208-09; *Cano*, 362 F. Supp. 2d at 846.

Sorensen, 31 F.3d at 642, is instructive. There, parents, on behalf of their children, brought suit seeking recovery for cognitive injuries of their children allegedly caused by the parents' consumption of chemically treated alfalfa tablets. The district court, in reviewing the testimony of the plaintiffs' experts, observed, in part:

> No expert designated to testify on plaintiffs' behalf in this action can identify either the number of mutagenic agents or the amount of such agents to which plaintiffs' parents were exposed prior to plaintiffs' births. Each expert designated to testify on plaintiffs' behalf in this case has assumed that plaintiffs' parents were not exposed to any substances, other than ETO and/or ECH, which have the ability to produce either teratogenic or mutagenic effects. ***The theories of causation which will be advanced by the expert witnesses designated to testify on plaintiffs' behalf in this case cannot distinguish the effects of ETO or ECH from other mutagenic or teratogenic substances to which plaintiffs' parents may have been exposed****....*

Id. at 642 (emphasis added). Those plaintiffs' experts stated in their reports that "to a reasonable degree of scientific certainty" the children's cognitive difficulties were the result of "parents who had consumed alfalfa tablets produced by Shaklee and fumigated with ETO." *See id.* at 642-43. At their depositions, however, the experts conceded that the parents' exposure to ETO was only a "possible cause" of the children's mental infirmities and that the parents were "probably exposed" to other sources of ETO and/or ECH during the relevant time period. *Id.* The Eighth Circuit expressly upheld the district court's exclusion of these experts' testimony, reasoning that "[w]hile it may be that this sort of reasoning could pass muster in some cases where the obvious result explains the etiology . . . such reasoning cannot apply . . . where ***several possible causes*** could have produced one effect." *Id.* at 649 (emphasis added).

Indeed, if it were otherwise, a case-specific expert would never need to review any case-specific information; he or she could simply identify potential risk factors identified in the

literature for a particular disease and label them all as "direct contributing factors." No case law permits Dr. Hu and Plaintiffs to shortcut their way past *Daubert* in this manner. Dr. Hu did not perform valid differential diagnoses as required under Eighth Circuit law, and therefore his specific causation opinions should be excluded.

C. DR. HU'S IQ-POINT-REDUCTION AND PERCENT ATTRIBUTABLE OPINIONS ARE NOTHING MORE THAN UNRELIABLE, COURTROOM SCIENCE, AND SHOULD BE EXCLUDED

Regarding lead's purported impact on Plaintiffs' intelligence, Dr. Hu takes his incomplete causation conclusions one step further and opines that each Plaintiff experienced at least a 6.9-point reduction in IQ due to lead exposure. He then purports to assign a certain percentage of each Plaintiff's IQ loss and neurobehavioral issues to lead emitted from DRP's operation of the Complex.

Dr. Hu arrives at his opinions as follows:

- First, Dr. Hu relies on the same population-based epidemiological paper noted above (Lanphear 2005) in which the authors concluded that lead exposure is ***associated*** with an incremental (non-linear) reduction in IQ points by BLL.[6] (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 196:10-17; Ex. B, 5/9/2019 Supp. Reports, pp. 3-7, 11-15.) Specifically, the authors found, on average, a 3.9 IQ-point reduction where tested BLLs are 2.4-10 µg/dL; an additional 1.9-point reduction from 10-20 µg/dL; and a further 1.1-point reduction from 20-30 µg/dL. (Ex. B, 5/9/2019 Supp. Reports, p. 13.)
- Second, based on BLL tests for Plaintiffs or Dr. MacIntosh's estimates of Plaintiffs'

[6] The Lanphear paper assesses IQ, a different measure of intellectual ability than GIA, utilized by Dr. Vega in assessing Plaintiffs. At his deposition, Dr. Hu could not identify any support in the medical or scientific literature for an association between lead exposure and GIA, as measured by the same testing methods adopted by Dr. Vega here. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 179:9-180:16.)

BLLs, Dr. Hu concludes that each Plaintiff likely had a BLL of greater than 20 µg/dL and, as such, experienced a 6.9-point reduction in IQ (3.9 + 1.9 + 1.1) from lead exposure. (*Id.*)[7]

- Third, Dr. Hu takes Dr. MacIntosh's calculations of the percentage of average community BLLs each year attributable to DRP's operations and applies them to each Plaintiff's actual or estimated BLLs and other neurobehavioral outcomes diagnosed by Dr. Vega. (*Id.* at pp. 6, 13-14.)
- Finally, he arrives at a range of IQ-point loss for each Plaintiff attributable to lead emission from DRP's operation of the Complex. (*Id.*)

Take Plaintiff A.T.M.C., for example:

- First, Dr. Hu takes Dr. MacIntosh's estimate of A.T.M.C.'s BLLs at ages 2 (28.2 µg/dL), 5 (19.5 µg/dL), and 7 (24.2 µg/dL) and averages them. (*See* Ex. B, 5/9/2019 Supp. Report for A.T.M.C.)
- Dr. Hu then concludes that based on the average estimated BLLs, A.T.M.C. lost 6.9 IQ points due to lead exposure.
- Dr. Hu then takes Dr. MacIntosh's calculation of the percent of BLLs attributable to DRP's operations for the years Dr. MacIntosh estimated A.T.M.C.'s BLLs: 2000 (35%), 2003 (70%), and 2005 (80%). (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 156:22-157:9.)
- He then calculates a range of DRP's contribution to A.T.M.C.'s lead exposures as

[7] Dr. Hu also makes an unsupported leap that, despite a non-linear relationship in which the majority of the impact attributable to lead exposure purportedly occurs at lower levels, it is "safe to assume" not just further IQ loss over 30 but resulting additional decrements in academic performance despite there not being any rigorous literature supporting this assumption. (Ex. B, 5/9/2019 Supp. Reports, p. 13.)

between 52% (mean for the years of A.T.M.C. estimated exposure, 1998-2005) and 75% (average for years when A.T.M.C. was age 4 to 7).

- Dr. Hu then concludes that "lead exposure had a direct adverse impact on A.T.M.C.'s intelligence, with a loss of 6.9 IQ points, with lead exposure attributable to Doe Run accounting for around 52 to 75% of the impact."[8]

In other words, according to Dr. Hu, A.T.M.C. lost between 1.73 to 3.31 IQ points as result of exposure to lead for which DRP has no responsibility. And he then lost an additional 3.59 to 5.18 IQ points as a result of exposure to lead from DRP's operations.

The below chart summarizes Dr. Hu's IQ opinions for all 16 Final Discovery Cohort Plaintiffs:

Plaintiff	Dr. Hu's Claimed Loss of IQ[9]	Percent of 6.9 IQ Point Loss Purportedly Attributable to DRP[10]	IQ Point Loss Purportedly Attributable to DRP
G.S.A.Y.	6.9	78-81%	5.4-5.6
S.R.B.C.	6.9	80-83%	5.5-5.7
G.C.S.	6.9	10-36%	0.7-2.5
N.K.C.V.	6.9	81-83%	5.6-5.7
J.R.E.L	6.9	65-77%	4.5-5.3
R.L.E.Y.	6.9	76-81%	5.2-5.6
J.J.E.C.	6.9	16-42%	1.1-2.9
D.F.G.C.	6.9	81-83%	5.6-5.7
Y.Y.H.E.	6.9	81-83%	5.6-5.7
A.T.M.C.	6.9	51-75%	3.5-5.2

[8] Dr. Hu also opines that lead exposure contributed to A.T.M.C.'s "difficulties with language processing, learning/memory, management of information load, [ ] sustained attention," and academics, with "lead exposure attributable to Doe Run account[ing] for around 52 to 75% of these effects." (*Id.* at 14.)

[9] For many Plaintiffs, Dr. Hu opines that the IQ loss is "at least 6.9," "more than 6.9" or "6.9 to greater than 6.9," but provides no further quantification.

[10] *See* Composite Ex. K, 8/9/2021 Supplemental Expert Reports of Dr. Hu, pp. 14, 15.

Plaintiff	Dr. Hu's Claimed Loss of IQ[9]	Percent of 6.9 IQ Point Loss Purportedly Attributable to DRP[10]	IQ Point Loss Purportedly Attributable to DRP
M.X.O.R.	6.9	80-81%	4.6-4.7/5.5-5.6
E.E.P.S.	6.9	51-75%	3.5-5.2
D.D.P.S.	6.9	81-83%	5.6-5.7
J.R.R.B.	6.9	18-40%	1.2-2.8
W.F.T.P.	6.9	51-74%	3.5-5.1
R.A.Y.A.	6.9	76-80%	5.2-5.5

1. Dr. Hu's IQ-Point-Loss Opinions Are Inadmissible Junk Science

Dr. Hu's specific IQ-point-reduction analysis meets none of *Daubert's* reliability factors. Dr. Hu admits that ***nowhere in the worldwide medical or scientific literature*** can one find an analysis like the one he conducted here. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 157:14-158:4, 204:12-205:2.) Indeed, to his knowledge, he ***is the first and only person to attempt to quantify the number of IQ points lost by a specific individual as a result of one of many different sources of lead***:

> Q. How many cases have you testified in in which one of the experts in the case created estimates for given years that attributed a certain percentage of lead in somebody's blood to one source versus another?
>
> A. I think this is probably the first one.
>
> Q. Yeah. Never seen anybody do that before, right?
>
> A. Not that I recall.
>
> Q. I mean, you've never done it before, right?
>
> A. No.

(*Id.* at 150:4-13). In no prior case has he or any other expert attempted to estimate a certain percentage of lead in blood attributable to one particular source for given years. (*Id.* at 150:4-8.) Dr. Hu has also never seen this type of percent attributable analysis before this case. (*Id.* at 150:10-

11.) Nor has the theory ever been tested or published in the peer-review literature, it has no known error rate, and it is not generally accepted in the scientific community. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 157:14-158:4, 204:12-205:2; *Daubert*, 509 U.S. at 593; *Kirk*, 887 F.3d at 391.

Dr. Hu also does not, in his practice, typically attempt to attribute a particular percentage of a patient's lead exposure to a specific source. (*Id.* at 58:16-25.) For instance, he never endeavors to identify a particular lead paint manufacturer as the source of a patient's lead exposure. (*Id*.) In the limited circumstances when he *has* sought to differentiate between various potential lead exposure sources, he has used lead isotopic ratios to the patient's blood to try to distinguish between multiple potential exposure sources, data not used in this case. (*Id.* at 59:5-13.) In other words, Dr. Hu relied on an objective, scientific test, rather than junk, courtroom science. In fact, Dr. Hu concedes that ***absent lead isotope data, there is no way to reliably identify the source of a given person's lead in the blood***:

> Q. Absent lead isotope data, there's no way to tell with any definitiveness the sources of a person's -- the various different sources of a person's lead that is in their blood; is that fair?
>
> * * *
>
> A. I would say that's true.

(*Id.* at 59:21-60:3.)

In short, Dr. Hu's attempt to derive specific IQ point decrements and percent attributable calculations is a litigation-driven analysis not used outside the courtroom and does not grow "naturally and directly out of research [he] has conducted independent of the litigation." *Hoffman v. Monsanto Co.*, 2:05-cv-00418, 2007 WL 2984692, at *3 (S.D. W.Va. Oct. 11, 2007) (when experts "have developed their opinions expressly for purposes of testifying," it casts doubt upon the reliability of her testimony).

2. Dr. Hu's IQ-Point-Reduction Opinions Should Also Be Excluded Because They Are Unreliable

Setting aside that all the standard hallmarks of junk science are present here, Dr. Hu's analysis is so methodologically flawed that it borders on the absurd. For starters, as discussed above, Dr. Hu applies patterns observed in groups of individuals from the single Lanphear (2005) pooled observational study to reach his opinion that each Plaintiff lost a specific number of IQ points. This is inappropriate. It is a well-established principle of epidemiology that one cannot take population-based observations from epidemiological studies and apply them to specific individuals. *See* Reference Manual on Scientific Evidence, Third Ed. (2011), p. 552 ("A final caveat is that employing the results of group-based studies of risk to make a causal determination for an individual plaintiff is beyond the limits of epidemiology."). Indeed, Dr. Hu has even acknowledged in the published literature that substantial variability exists in how individual persons develop symptoms from exposure to lead. *See, e.g.*, Ex. L, Robert O. Wright, et al. (including Dr. Hu), Association between Homechromatosis Genotype and Lead Exposure among Elderly Men: The Normative Aging Study, 112 Environmental Health Perspectives 746, 746 (2004) ("There is considerable variability in the development of toxicity in response to lead exposure in the general population. Genetic factors that modify the absorption, metabolism, or excretion of lead may influence lead toxicity."). Precisely because of this interindividual variability it is impossible to extrapolate weak population data to specific individuals. And while Dr. Hu refuses to acknowledge that here, Plaintiffs' other experts, such as Jill Ryer-Powder, agree:

> A. So you're asking me if I can say this child will lose X IQ points because their blood lead level was Y? Am I able to say that? Is that what you're asking me?
>
> Q. Yes.
>
> A. No, I'm not able to say --

* * *

Q. Did I understand your answer to be, No, I'm not able to say that?

* * *

A. I'm saying that there is a causal relationship between cognitive function deficits and increase in blood lead level ***but I cannot say this particular child's IQ won't decrease by X amount because their blood lead level is Y***.

(Ex. M, 8/19/2020 Ryer-Powder Dep., 95:5-96:3 (emphasis added); *see also* 71:5-7, 73:21-23 (it is not always correct to infer causality from an association.)

Regardless, even if one were to assume that the associations reported in the literature reflect a cause and effect relationship between lead exposure and measures of IQ in a given person, the literature reflects such a ***small effect***, they could never be measured in an individual child. (Ex. N, Gilbert and Weiss (2006), p. 697 ("For an individual child, the consequences [of low-level Pb exposure on IQ] are difficult to discern given that small changes in IQ score occur from one test occasion to the next."); Ex. O, Searle et al. (2014), p. 46, ("[T]hese findings suggest that the associations between early childhood lead exposure and subsequent developmental outcomes may persist. However, as the magnitude of these effects was small, they are not discernible at the individual level, posing more of a population health concern."). As one author has put it:

> The only accurate response to the question of whether a blood lead level of 20 µg/dL has impaired the cognitive functioning of a specific child is, '**The scientific literature provides us with no way to determine for this child whether there has been any effect, and if there has been, what it is**.'

(Ex. P, Ruff, 1999, p. 48 (emphasis added.)). In short, there is simply no basis – much less a reliable one – to conclude that every single person exposed to greater than 20 µg/dL of lead has lost 6.9 IQ points. To permit Dr. Hu to do so here would violate accepted norms regarding use of epidemiology and would be incredibly misleading and prejudicial to Defendants.

Dr. Hu's opinion is further unreliable and misleading because Dr. MacIntosh did not even conduct percent-attributable calculations for each individual Plaintiff to which Dr. Hu can then layer into his plaintiff-by-plaintiff analysis. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 157:10-13.) Instead, Dr. MacIntosh calculated an ***average*** based on a population analysis to arrive at an estimate of percent attributable to DRP operations. Dr. Hu then applies that community or regional average to individual Plaintiffs. There is, however, no reliable basis for Dr. Hu to apply Dr. MacIntosh's annual population-based calculations (e.g., 35% of BLLs in 2000 are attributable to DRP's operations) to specific individuals' BLLs. In doing so, Dr. Hu fails to account for factors like age, specific location of residence or schooling in the La Oroya area, or exposure history, all of which would affect the purported impact on any given individual. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 158:9-161:8.) For example, Dr. Hu did not attempt to determine the lead source attributable to the first 10 µg/dL of exposure, which their own cited literature (Lanphear) says has the greatest impact on intellect. (*Id.* at 235:8-12.) This failure to account for Plaintiffs' individual characteristics renders his analysis further unreliable. *See Roberts v. Gen. Motors, LLC*, No. 4:13-CV-541 CAS, 2015 WL 6955362 (E.D. Mo. Nov. 10, 2015) (excluding testimony because it was generalized, and not tied to the particular circumstances of the crash that had injured the plaintiff); *In re Dicamba Herbicides Litig.*, No. MDL 2820, 2019 WL 6340260, at *8 (E.D. Mo. Nov. 27, 2019) (excluding expert who attempted to extrapolate data without "investigat[ing] or account[ing] for differences in geography and growing conditions.").

3. Dr. Hu's IQ Loss And Percent Attributable Opinions Are Inadmissible Because They Amount To No More Than Improper Repetition Of Plaintiffs' Other Experts' Hearsay Opinions

Dr. Hu's IQ loss and percent attributable estimates should also be excluded because he does no more than parrot the opinions of Dr. MacIntosh on areas outside of Dr. Hu's expertise and because Dr. Hu has done no work to verify the accuracy of Dr. MacIntosh's estimates. As

discussed above, an "expert's opinion must be based upon his or her own application of principles within his [or] her expertise to the facts of the case." *Hill v. Fikes Truck Line, LLC*, No. 4:11-CV-816 CAS, 2012 WL 5258753, at *3 (E.D. Mo. Oct. 24, 2012) "An expert [ ] may not simply repeat or adopt the findings of another expert without attempting to assess the validity of the opinions relied upon." *DMS Imaging, Inc.*, 2010 WL 11618964, at *3; *Deutz Corp. v. City Light & Power, Inc*., 2009 WL 2986415, at *6 (N.D. Ga. Mar. 21, 2009) ("While Rule 703 permits an expert to rely on "facts or data" that are not otherwise admissible into evidence in forming his opinion, it does not permit an expert to simply parrot the opinions of other experts.").

But Dr. Hu simply took Dr. MacIntosh's exposure assessment and calculations and plugged them into his reports without even attempting to evaluate the accuracy or reliability of those opinions.[11] Dr. Hu's "exposure assessment" for each Plaintiff includes BLLs where available and where not, copies Dr. MacIntosh's estimates of BLLs. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 76:14-16.) Dr. Hu did no calculations of his own to estimate Plaintiffs' BLLs. (*Id.* at 80:4-7) He has not seen Dr. MacIntosh's underlying data or endeavored to verify the accuracy of his model (*id.* at 80:16-25; Ex. Q, 9/1/2021 Deposition of Dr. Howard Hu ("9/1/2021 Hu Dep."), 26:9-17), does not know how Dr. MacIntosh arrived at his estimates (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 81:1-2), and could not answer any questions about Dr. MacIntosh's methodology. (*See, e.g.*, *Id.* at 85:3-86:2, 90:7-16, 152:19-153:2.)

Similarly, Dr. Hu wholly relies on Dr. MacIntosh's "percent attributable" calculations. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 156:6-157:5.) Like with his exposure assessment, Dr. Hu's

[11] Dr. MacIntosh's estimates are unreliable for the reasons discussed in the MacIntosh *Daubert* motion, filed contemporaneously herewith. Accordingly, Dr. Hu's reliance on Dr. MacIntosh's BLL estimates is flawed and renders his opinions based thereon inadmissible for the same reasons. *See Junk*, 628 F.3d 449 (finding that an expert's opinion was properly excluded when it relied on the excluded opinion of another expert).

report merely copies Dr. MacIntosh's figures and summarizes Dr. MacIntosh's work. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 48:7-9, 119:18-120:23, 143:15—144:1.) Dr. Hu did no calculations to arrive at those figures (*Id.* at 119:18-120:24, 144:4-6) and did nothing to verify the accuracy of MacIntosh's estimates. (*Id.* at 144:7-14)[12]

Given the importance of the accuracy of Dr. MacIntosh's model and calculations to Dr. Hu's opinions, such blind reliance solely on Plaintiffs' information without independently evaluating it precludes his opinions. *See, e.g.*, *In re TMI Litig.*, 193 F.3d 613, 715–16 (3d Cir. 1999) (finding blind reliance by expert on other expert opinions demonstrates flawed methodology under *Daubert*); *TK–7 Corp. v. Estate of Barbouti*, 993 F.2d 722, 732–33 (10th Cir. 1993) (excluding expert opinion relying on another expert's report because witness failed to demonstrate a basis for concluding report was reliable and showed no familiarity with methods and reasons underlying the hearsay report); *E.E.O.C. v. Bloomberg, L.P.*, No. 07 Civ. 8383 (LAP), 2010 WL 3466370, at *14 (S.D.N.Y. Aug. 31, 2010) (excluding testimony of social psychology expert because he only analyzed material provided by plaintiff, "[r]elying solely on the information fed to him by the EEOC without independently verifying whether the information is representative undermines the reliability of his analysis.").

Finally, Dr. Hu does purport to have examined independently the background rate of lead exposure for Plaintiffs (i.e., non-smelter lead exposure), one component of Dr. MacIntosh's "percent attributable" calculations. Interestingly, Dr. Hu's report cites the same literature cited in

[12] Dr. Hu also seeks to apply Dr. MacIntosh's percent attributable calculations to Plaintiffs' other non-intelligence-related neurodevelopment complaints, like ADHD, specific learning disorders, and intellectual disabilities diagnosed by Dr. Vega. Dr. Hu, however, conducted no analysis in concluding it was reasonable to apply these calculations to myriad other complex neurobehavioral symptoms alleged by Plaintiffs. Instead, his reports state only that "it is reasonable to assume" that the same predictive metrics would apply to these other neurobehavioral outcomes but provides no support whatsoever for this "assumption." (Ex. B, 5/9/2019 Supp. Reports, pp. 14, 15.)

Dr. MacIntosh's report, in the same order; Dr. Hu claims this is merely a "coincidence." (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 45:24-48:3.) Regardless, both Dr. MacIntosh and Dr. Hu cherry-picked data favorable only to their theories while ignoring studies opposing their view, including the only study with data from the Central Andean Highlands of Peru. (*Id.* at 137:20-140:16.) Instead, they estimate a background BLL of 5 µg/dL, when only one study they actually cite finds a background lead level lower than 7 µg/dL. (*Id.* at 140:13-141:7.) Such selective reasoning is not viable under *Daubert*. *See Bloomberg, L.P.*, 2010 WL 3466370 at *14; *Lust*, 89 F.3d 594, 596 (9th Cir. 1996) (agreeing with the district court that expert's conclusion was unreliable because he "pick[ed] and chos[e]" from the scientific landscape).

4. Dr. Hu's IQ Loss And Percent Attributable Opinions Are Not Relevant And Unfairly Prejudicial And Should Therefore Be Excluded

Lastly, Dr. Hu's IQ loss and percent attributable opinions should be excluded because he cannot articulate the ***relevance*** of Plaintiff's purported loss of 6.9 IQ points. Fed. R. Evid. 401. Dr. Hu's reports include ***no*** opinions on the impact of the estimated loss of IQ for any of the Plaintiffs, including whether it would have any impact on education or employment prospects. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 235:4-238:23.) Dr. Hu also refused to provide opinions on this topic at his depositions. (*Id.*; *see also* Ex. I, 8/6/2020 Hu Dep., 151:1-22.) Indeed, the record is devoid of any evidence that a loss of 6.9 IQ points (or less) would impact a person's academic achievement or employment opportunities in La Oroya, Peru.

Dr. Hu was unable to offer an opinion on the actual effect of the purported IQ decrements estimated in this case because, in reality, there is no measurable impact of the incremental additional IQ loss as Plaintiffs purportedly experienced as a result of DRP's operations. As reflected in the chart at page 33, Dr. Hu is offering the opinion that emissions from DRP's operation of the La Oroya Complex are responsible for IQ decrements in Plaintiffs ***ranging from***

only 0.7 to 5.7 points. (*See* Ex. B, 5/9/2019 Supp. Reports, p. 14.) As Dr. Hu himself recognizes in his own research, however, IQ scores will vary between 3 and 5 points across multiple administrations of the same testing. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 192:23-193:11.) This means that if an individual were given an IQ battery 100 times, 95 times out of 100 he or she would score within 3 to 5 points (high or low) of their "true" IQ score. (*Id.* at 193:12-16.) Stated another way, IQ scores of 95, 100, and 105 are functionally and clinically equivalent.

Furthermore, as Plaintiffs' own neuropsychology expert Dr. Vega concedes (as he must), a single point decline—as several plaintiffs in this cohort are pursuing—is "not even considered," because "one point doesn't matter." (Ex. R, 5/8/2019 Deposition of Clemente Vega, 301:11-304:12.) Rather, the loss, according to Dr. Vega, must be "a much larger number" to be clinically significant. (*Id.* at 302:4-303:9.) Indeed, even a 5-point decrease in IQ points—about the outer limit of what is allegedly attributable to Defendants here—may only be clinically significant in "some cases." (*Id.* at 19-21.)

Dr. Hu should not be permitted to tell the jury that Plaintiffs "lost IQ points," only to leave it to the jury to speculate about what that means. That is wildly prejudicial to Defendants and unhelpful to the jury. Fed. R. Evid. 403; *see U.S. v. Frazier*, 387 F.3d 1244, 1263 (11th Cir. 2004) ("Because of the powerful and potentially misleading effect of expert evidence, sometimes expert opinions that otherwise meet the admissibility requirements may still be excluded [under Federal Rule of Evidence] 403.") (citation and quotations omitted).

D. DR. HU'S OPINION THAT PLAINTIFFS ARE AT INCREASED RISK FOR DEVELOPING HYPERTENSION IS UNRELIABLE AND SPECULATIVE

Dr. Hu also intends to opine that Plaintiffs are all at an increased risk of developing hypertension as adults due to their alleged lead exposure. (Ex. B, 5/9/2019 Supp. Reports, at pp. 16-17.) Like his specific causation opinions, however, Dr. Hu's opinions are based on incomplete

information. (*See, e.g.*, Ex. I, 8/6/2020 Hu Dep., 45:13-46:7 (maintaining hypertension opinions despite conceding he has not reviewed recent information available on plaintiffs).) As discussed above, Dr. Hu did not review Plaintiffs' medical records, the available discovery materials, or Defendants' expert's medical evaluations before rendering his increased-risk opinions. (*See*, supra, section B.1.) He also has not examined three of the 16 Plaintiffs and his examinations of 13 Plaintiffs were four years ago. Consequently, his opinions are pure speculation and not helpful to the jury.

Further, under Missouri law, to make a claim based on an increased risk of injury, a plaintiff must prove that he or she has a greater than 50 percent chance of suffering the injury in the future. *See Thomas v. FAG Bearings Corp. Inc.*, 846 F. Supp. 1400, 1408 (W.D. Mo. 1994) ("future damages in a personal injury action are not compensable unless reasonably certain to occur."); *Elam v. Alcolac, Inc*., 765 S.W.2d 42, 208 (Mo. Ct. App. 1988) (increased risk claim actionable only if the "reasonably certain to occur—as quantified by expert testimony as a probability of occurrence greater than 50 percent."). Dr. Hu, however, ***has not quantified Plaintiffs' individual risk of developing hypertension*** due to their alleged lead exposure. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 252:21-253:2.) In other words, his opinion is that any person is at increased risk for any condition associated with the exposure at issue. As such, Dr. Hu's ***unquantified*** increased risk opinions are speculative, not relevant, and their presentation to the jury would only risk substantial juror confusion and prejudice to Defendants. Fed. R. Evid. 403 (Otherwise relevant evidence may still be excluded "if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence."). They should be excluded.

E. DR. HU SHOULD NOT BE PERMITTED TO TESTIFY ABOUT HEALTH EFFECTS OF ARSENIC OR SULFUR DIOXIDE EXPOSURE

Dr. Hu writes in his reports that he agrees with the analyses of Plaintiffs' experts Dr. Jill Ryer-Powder and David Sullivan concerning Plaintiffs' exposure to arsenic and sulfur dioxide and the risks presented by said exposure. (Ex. B, 5/9/2019 Supp. Reports, at pp. 17-18.) Yet, at his deposition, Dr. Hu testified that he was not prepared to offer opinions on whether any Plaintiff was at an increased risk for developing disease as a result of arsenic or sulfur dioxide exposure:

> Q. Is Anthony at an increased risk of cancer?
>
> A. I'm not prepared to give an answer to that today.
>
> Q. Are you prepared today to tell me that any of these 17 plaintiffs are at an increased risk of cancer due to exposure to arsenic?
>
> A. That has not been my focus, and I'm not prepared to tell you -- say that.
>
> *** *** ***
>
> Q. You are not -- are you offering an opinion in this case that any of these plaintiffs have any injuries as a result of their exposure to sulfur dioxide?
>
> *** *** ***
>
> A. I haven't in these – in these reports mostly because from my point of view they have not had the necessary clinical workup to determine that.

(Ex. A, 5/16/2019 Hu Dep., 24:7-12, 171:14-172:18; *see also id.* at 169:24-171:13:23.) He confirmed this again at a supplemental deposition in September 2021. (*See* Ex. Q, 9/1/2021 Hu Dep., 67:9-68:22.) Indeed, Dr. Hu did not analyze Plaintiffs' exposure to arsenic or sulfur dioxide, nor did he do any work to verify the opinions of David Sullivan or Jill Ryer-Powder. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 168:5-23; 169:3-10; Ex. Q, 9/1/2021 Hu Dep., 61:19-62:14.) And he has not diagnosed any Plaintiff with any health effect that he attributes to arsenic or sulfur dioxide exposure. (Ex. A, 5/16/2019 Hu Dep., 24:7-12, 172:10-23.)

Consequently, to the extent Plaintiffs seek to have Dr. Hu offer opinions on the health

effects of arsenic or sulfur dioxide, he should be precluded from doing so as his opinions were not properly disclosed pursuant to Rule 26(a)(2)(B) of the Federal Rules of Civil Procedure and are not supported by a proper foundation or methodology.

IV. CONCLUSION

Defendants respectfully request that the Court grant this motion and exclude the expert opinion testimony of Dr. Howard Hu as stated herein.

Respectfully submitted,

KING & SPALDING LLP

By: */s/ Geoffrey M. Drake*
Tracie J. Renfroe, #16777000T
trenfroe@kslaw.com
Carol M. Wood, #2594581
cwood@kslaw.com
1100 Louisiana Street
Suite 4000
Houston, Texas 77002
Telephone: (713) 751-3200
Facsimile: (713) 751-3290

Andrew T. Bayman, #043342GA
abayman@kslaw.com
Carmen R. Toledo, #714096GA
ctoledo@kslaw.com
Geoffrey M. Drake, #229229GA
gdrake@kslaw.com
1180 Peachtree Street, N.E.
Suite 1600
Atlanta, Georgia 30309
Telephone: (404) 572-4600
Facsimile: (404) 572-5100

James P. Cusick, #4041653NY
jcusick@kslaw.com
1185 Avenue of the Americas, 34th Floor
New York, New York 10036
Telephone: (212) 556-2170
Facsimile: (212) 556-2222

LEWIS RICE LLC

Andrew Rothschild, #23145MO
arothschild@lewisrice.com
Thomas P. Berra, Jr., #43399MO
tberra@lewisrice.com
Michael J. Hickey, #47136MO
mhickey@lewisrice.com
600 Washington Ave., Suite 2500
St. Louis, MO 63102-2147
Telephone: (314) 444-7600
Facsimile: (314) 241-6056

Attorneys for Defendants The Doe Run Resources Corporation, Marvin K. Kaiser, Albert Bruce Neil, Jeffery L. Zelms, and Theodore P. Fox, III

DOWD BENNETT LLP

Edward L. Dowd, Jr. #28785MO
edowd@dowdbennett.com
Jeffrey R. Hoops, #69813MO
jhoops@dowdbennett.com
7733 Forsyth Blvd., Suite 1900
St. Louis, Missouri 63105
(314) 889-7300 (telephone)
(314) 863-2111 (facsimile)

Attorneys for Defendants The Renco Group, Inc., DR Acquisition Corp., Ira L. Rennert, and Doe Run Cayman Holdings, LLC

Attorneys for Defendants The Renco Group, Inc., D.R. Acquisition Corp., Doe Run Cayman Holdings, LLC, Ira L. Rennert, The Doe Run Resources Corporation, Theodore P. Fox, III, Marvin M. Kaiser, Albert Bruce Neil, Jeffrey L. Zelms

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 15th day of November, 2021, a true and correct copy of the foregoing was filed with the Clerk of the Court through the Court's CM/ECF system, which will affect service on all counsel of record by sending a Notice of Electronic Filing.

/s/ *Geoffrey M. Drake*